



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/300,022	04/27/1999	F. JOSEPH POMPEI	109026-005P1	3989

21323 7590 01/13/2005

TESTA, HURWITZ & THIBEAULT, LLP
HIGH STREET TOWER
125 HIGH STREET
BOSTON, MA 02110

EXAMINER

PENDLETON, BRIAN T

ART UNIT	PAPER NUMBER
----------	--------------

2644

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/300,022

Applicant(s)

POMPEI, F. JOSEPH

Examiner

Brian T. Pendleton

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 28-33, 37-40 and 48-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 28-33, 37 and 48-50 is/are rejected.
- 7) ☒ Claim(s) 38-40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/27/99 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 28, 37, and 49-50 are rejected under 35 U.S.C. 102(e) as being anticipated by Norris, US Patent 6,108,433. Norris discloses an ultrasonic emitter device comprising an ultrasonic signal source 104, a source of audio signals 120, AM modulator 112 and ultrasonic transducer driver 110 and inherently having means for applying the modulated carrier to the transducer. Claim 1 is met. Per claim 28, the apparatus modulates an ultrasonic carrier from source 104 with audio signal 120 with a frequency of the carrier above human hearing and directs a beam containing the modulated carrier toward a location. As to claim 37, the apparatus of Norris meets the method claim. As to claims 49 and 50, inherently the level of the modulated carrier is adjusted to response to a change in the audio signal source.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Reynard, US Patent 4,311,881 further in view of Cherek et al. Norris does not disclose that the transducer is a capacitive transducer having a mechanical resonance. However, it was well known, as evidenced by Reynard which discloses an electrostatic transducer, to use capacitive transducers for ultrasonic speaker applications. The combination of Norris and Reynard does not disclose an inductor coupled to the transducer to provide an electrical resonance corresponding with the mechanical resonance of the transducer. Cherek et al disclose a matching transformer for ultrasonic transducer. As suggested in column 1 lines 17-42, it was common to use transformers or other inductive components in matching circuits for the purpose of increasing the quality factor of the transducer circuit. That was an advantageous feature. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to couple an inductor to the transducer in the modified Norris apparatus. Claim 2 is met. Per claim 48, it was well known to use a film-based transducer when implementing a capacitive transducer.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Mattila, "Bandwidth Control of an Electrostatic Ultrasonic Transducer". Norris does not teach that the transducers have first and second acoustical-mechanical resonances whereby one transducer has a higher resonance frequency than the other transducer. Mattila teaches that the bandwidth of an electrostatic ultrasonic transducer can be increased by using a multiple sized groove pattern in the backplate of the transducer (see abstract). In addition, sections 3 and 4 suggest that by having different depths of the grooves in the backplate of the ultrasonic speaker, different individual transducers with unique resonance frequencies can be achieved. As a result, the bandwidth of the transducer is widened. Therefore, it would have been obvious to one of

Art Unit: 2644

ordinary skill in the art at the time of invention to have the transducers in the Norris invention have different resonances, per the teachings of Mattila. Modifying the Norris apparatus in that fashion would have increased the bandwidth of the loudspeaker 14, an advantageous feature. Inherently, one transducer would have a higher resonance frequency than the other transducer. As to claim 5, ultrasonic transducers have ultrasonic energy above the human hearing frequency range.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Mattila as applied to claim 3 above, and further in view of Alexander. The combination of Norris and Mattila disclose an ultrasonic transducer with an ultrasonic signal source, first and second ultrasonic transducers with different resonance frequencies, an audio signal source, modulator and means for driving the transducer. The combination does not teach a means for splitting the modulated carrier into upper and lower frequency range signals and driving the first transducer with lower frequency signals and the second transducer with upper frequency signals. Nonetheless, the feature was already known in the art, recognized as a crossover circuit. Such circuits were common, as evidenced by Alexander, in the art of multiple transducer loudspeakers. Shown in figure 1, an audio signal inputted into terminal 10 is split into a high frequencies and low frequencies for reproduction by two separate transducers 18 and 24. Since it was well known to separate an input signal source into frequency ranges for reproduction by multiple transducers, it would have been obvious to one of ordinary skill in the art at the time of invention to do so in the combination of Norris and Mattila.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Mattila in further view of Alexander as applied to claim 4 above, and further in view of Cherek

et al. The combination of Norris, Mattila and Alexander teach an apparatus comprising an ultrasonic transducer with an ultrasonic signal source, first and second ultrasonic transducers with different resonance frequencies, an audio signal source, modulator, means for driving the transducer and means for splitting the modulated carrier into upper and lower frequency range signals and driving the first transducer with lower frequency signals and the second transducer with upper frequency signals. The combination does not teach that the driving means includes an inductor conducted to resonate with the capacitative element of the transducer, providing an electrical resonance corresponding with the acoustical-mechanical resonance of the transducer. Cherek et al disclose a matching transformer for ultrasonic transducer. As suggested in column 1 lines 17-42, it was common to use transformers or other inductive components in matching circuits for the purpose of increasing the quality factor of the transducer circuit. That was an advantageous feature. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to include an inductor in the driving means in the apparatus described by the teachings of Norris, Mattila and Alexander.

Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Cherek et al. Norris discloses a loudspeaker 40 having ultrasonic transducers 41 (at least a first and second transducer), ultrasonic signal source 50 (carrier), audio signal source 10, amplitude modulator 20 for modulating the carrier with the audio signal source and driver 30. Norris does not teach an inductor in series with the driver 30. However, as discussed above, it would have been obvious to one of ordinary skill in the art at the time of invention to provide an inductor in series with the driver, per the teachings of Cherek et al, in the invention of Norris. Including the inductor would have increased the quality factor of the transducer circuit.

Art Unit: 2644

Claims 30, 31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris in view of Brandstein et al, US Patent 6,243,471. Norris does not disclose tracking the location of an apparent source and directing the beam toward the moving location. Brandstein discloses a method and apparatus for locating the direction of a source and steering a camera in that direction in figure 1. Thus, it was taught to locate a visual image with the position where sound is emitted. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to track the location of an image source and direct the sound in the direction of the image source in the invention of Norris for the purpose of improving the realism of an audio/visual environment. Claims 30 and 33 are met. As to claim 31, it was obvious that the audio signal from Norris would be directed at a visual image.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris. Norris does not disclose using a surface that absorbs or reflects ultrasonic energy and reflects audio energy. Nonetheless, that feature was well known in the art of ultrasonic speakers. The use of an absorbent surface would be to generate an omni-directional signal while a reflected surface would generate a highly directive sound signal. It would have been obvious to one of ordinary skill in the art at the time of invention to use a reflector in the apparatus of Norris for the purpose of generating a directional audio sound, an advantageous feature. The resultant sound in Norris would have created a sound with more ambiance for the listener.

Allowable Subject Matter

Art Unit: 2644

Claims 38-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (703) 305-9509. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Le Huyen can be reached on (703) 305-4844. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian T. Pendleton
Examiner
Art Unit 2644

